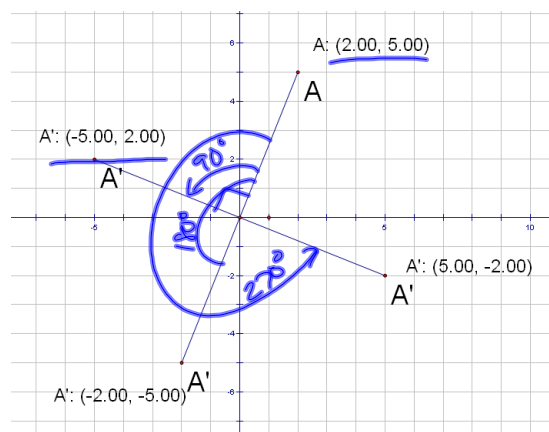
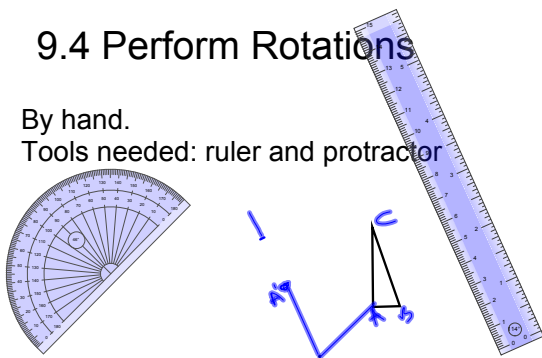


9.4 Perform Rotations

By hand.

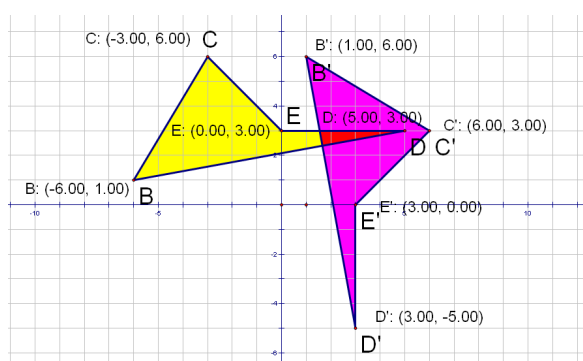
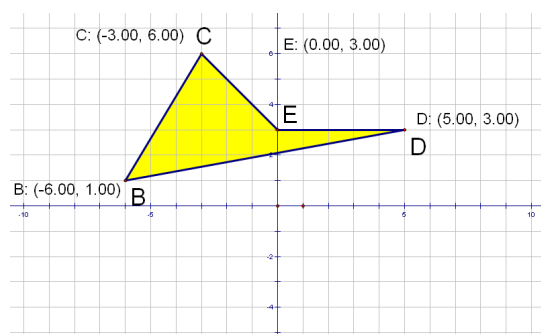
Tools needed: ruler and protractor



Coordinate Summary for Rotations about the Origin

1. For a rotation of 90° , $(a, b) \rightarrow (-b, a)$
2. For a rotation of 180° , $(a, b) \rightarrow (-a, -b)$
3. For a rotation of 270° , $(a, b) \rightarrow (b, -a)$

Graph BCED and rotate it 270°



Rotation Matrices

$$\begin{array}{l}
 90^\circ \quad \begin{bmatrix} a \\ b \end{bmatrix} \rightarrow \begin{bmatrix} -b \\ a \end{bmatrix} \quad \begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \\
 180^\circ \quad \begin{bmatrix} a \\ b \end{bmatrix} \rightarrow \begin{bmatrix} -a \\ -b \end{bmatrix} \quad \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix} \\
 270^\circ \quad \begin{bmatrix} a \\ b \end{bmatrix} \rightarrow \begin{bmatrix} b \\ -a \end{bmatrix} \quad \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix} \\
 360^\circ \quad \begin{bmatrix} a \\ b \end{bmatrix} \rightarrow \begin{bmatrix} a \\ b \end{bmatrix} \quad \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}
 \end{array}$$

Find the image matrix of BCDE that represents a 90° rotation about the origin.

B: (-6.00, 1.00)

C: (-3.00, 6.00)

D: (5.00, 3.00)

E: (0.00, 3.00)

90° Polygon Matrix

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} \cdot \begin{bmatrix} -6 & -3 & 5 & 0 \\ 1 & 6 & 3 & 3 \\ -1 & -6 & -3 & -3 \\ -6 & -3 & 5 & 0 \end{bmatrix}$$

9.7 Identify and Perform Dilations

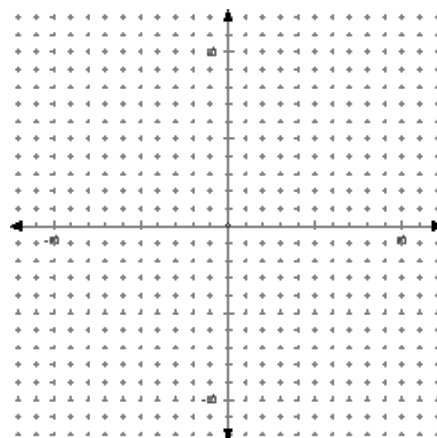
scalar multiplication--multiply each element of a matrix, by a real number

The vertices of XYZW are X(-4, 4) Y(2, 8) Z(6, 2) and W(-2, -4)

Use scalar mult. to find the image after a dilation centered at the origin with a scale factor of .5

Graph the preimage and image.

$$\frac{1}{2} \begin{bmatrix} -4 & 2 & 6 & -2 \\ 4 & 8 & 2 & -4 \\ -2 & 1 & 3 & -1 \\ 2 & 4 & 1 & -2 \end{bmatrix}$$

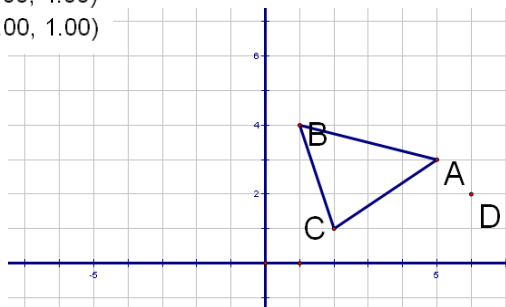


Dilate $\triangle ABC$ with a scale factor of 2 centered at D(6,2)

A: (5.00, 3.00)

B: (1.00, 4.00)

C: (2.00, 1.00)



HW p602 #s 3-9, 13, 17
p629 #s 18, 19, 32

not centered at origin

Attachments

9_4notes_ex.gsp

9_7notes_ex.gsp